

Physical Sciences Notes

ASTRONOMY

Determining Mass of Asteroid Vesta

An attempt is being made to determine the mass of the asteroid Vesta by the changes its mass causes in the orbit of another asteroid, Arete, which has approached Vesta within a few hundredths of an astronomical unit five times since its discovery in 1879. These approaches occur every 18 years.

A preliminary analysis of 59 observations of Arete during the period between 1879 and 1962 indicates that the mass of Vesta is about a ten-billionth that of the sun. Dr. Hans G. Hertz of Goddard Space Flight Center, Greenbelt, Md., has asked astronomers to add further observations by remeasuring plates used only to determine approximate positions. His request was circulated to observatories around the world by the world center for astronomical information at the Smithsonian Astrophysical Observatory in Cambridge, Mass.

NUCLEAR TESTING

Thermonuclear Blast

The massive thermonuclear device set off underground in Nevada last week was purely and simply a weapons test, with only peripheral implications for seismology, nuclear test detection or other purposes. The test, largest ever held within the United States, was equivalent to 200,000 to a million tons of TNT. It registered 6.3 on the Richter earthquake scale, a point higher than a massive Soviet test the day before.

SCIENTIFIC MANPOWER

Survey Ranks Scientists' Salaries

A survey conducted every two years by the National Science Foundation indicates that in 1966 the highest median salaries among 243,000 U.S. scientists were reported by economists, statisticians and physicists. Those in each group earned \$13,100, \$12,800 and \$12,500 as median salaries, respectively. The lowest median wage, an even \$10,000, was paid to those working in agricultural sciences and linguistics. The median for all scientists was \$12,000, an increase of \$1,000 over the figure reported for 1964.

RADIOACTIVE FALLOUT

Increase in Radioactive Fallout

Radioactive fallout from past nuclear tests will increase during the next eight years, then begin to decline more rapidly than previously anticipated, Dr. Milton S. Plesset of California Institute of Technology has calculated. Despite the predicted increase, however, the fallout from past nuclear tests will leave our atmosphere about a third more rapidly than had been thought.

The radioactive debris is due mainly to large test explosions by the United States and Russia before the 1963 test ban treaty. An estimated 500 megatons have been detonated in above-ground nuclear tests. Although the total radioactivity from fallout in the atmosphere is small compared with the natural background radiation from cosmic rays and other sources, Dr. Plesset pointed out that carbon 14 is significant because it poses a long-term and worldwide threat to the genetic material of all living things. Carbon 14 has a half-life of 5,739 years.

METEOROLOGY

Charting Earth's Snowfall Cover

The snowfall cover of the earth can be charted from satellites if there is at least an inch of snow on the ground. Satellite pictures can be used not only to identify snow-covered areas but to measure snowfall depth.

The finding is significant because snow is a major contributor of water to rivers and streams around the world.

Meteorologists at the Weather Bureau's office of hydrology have found that snow distribution can be mapped from satellite photographs with an accuracy of about 20 miles. Sufficient detail in the snow pattern can be recognized to permit outlining individual river basins as small as 400 square miles.

In exposed areas, snow depths of three inches or less have been found to show lower reflectivity than those of greater depths. They stand out more brightly on the satellite pictures, with sufficient contrast for practical evaluation.

ASTRONOMY

Saturn-Like Ring Halos Earth

A cloud of dust particles surrounds earth, giving it a halo like one of the rings around Saturn. The ring is not very dense nor even, but would be visible from space under some circumstances.

The halo of matter was detected by an expedition of the Polish Astronautical Society under the direction of Dr. K. Kordylewski. In 1961, Dr. Kordylewski reported the discovery of two natural, cloud-like satellites circling earth in paths at the same distance as the moon. Now the Polish astronomer and his co-workers have found that the light-reflecting material exists not only at the two points but also along the entire lunar orbit.

This terrestrial ring can be detected only at specified times, Dr. Kordylewski reported to the Smithsonian Astrophysical Observatory's world center for astronomical discoveries in Cambridge, Mass. The next time for favorable observation is Jan. 7 through Jan. 21 in the constellations of Leo and Virgo.

SPACE SCIENCE

Russians Launch 13th Moon Craft

The Soviet Union launched her 13th unmanned space craft toward the moon in time for a Christmas Day rendezvous with earth's natural satellite. It was the fifth Russian space rocket sent moonward during 1966.

The rocket, called Luna 13, was launched from the central Asian space center on Dec. 21, along with an unmanned Cosmos 137 satellite whose orbit put it in the spy-in-the-sky category. The Cosmos satellites are related to the Soviet Union's program of manned flights, the last of which took place in March, 1965. Russia's lunar probes are assumed to be in preparation for a manned landing on the moon; no date has been announced for the attempt. The United States is making an intensive effort to land an Apollo astronaut on the moon before 1970.

It was signals from an earlier Cosmos that enabled students at a high school near London, using primitive equipment, to pinpoint recently a previously unidentified secret Soviet launching site near Archangel.